

## CLAIMS

What is claimed is:

- 1           1.       A thermal liner for use in a protective garment, the liner comprising:  
2           an insulation layer comprising a batt of entangled flame resistant fibers, the  
3           insulation layer having a three-dimensional pattern that defines a plurality of closed-cell  
4           air pockets that are configured to trap air to insulate a wearer of the thermal liner, the  
5           insulation layer being shaped and configured for inclusion in the protective garment and  
6           for donning by the wearer.
  
- 1           2.       The thermal liner of claim 1, wherein the batt comprises at least one of  
2           aramid, melamine, FR rayon, modacrylic, and carbon fibers.
  
- 1           3.       The thermal liner of claim 1, wherein the closed-cell air pockets are  
2           formed on an inner side of the insulation layer adapted to face the wearer.
  
- 1           4.       The thermal liner of claim 1, wherein the closed-cell air pockets are  
2           defined by boundary walls.
  
- 1           5.       The thermal liner of claim 1, wherein the closed-cell air pockets comprise  
2           repeated geometric shapes.

1           6.       The thermal liner of claim 5, wherein the repeated geometric shapes  
2       comprise at least one of honeycombs, circles, and triangles.

1           7.       The thermal liner of claim 1, wherein the closed-cell air pockets have  
2       transverse dimensions within the range of about 1/16 inches to about 1/2 inches and depth  
3       dimensions within the range of about 1/8 inches to about 5/16 inches.

1           8.       The thermal liner of claim 1, wherein the insulation layer has a weight in  
2       the range of about 0.75 ounces per square yard to about 8 ounces per square yard.

1           9.       The thermal liner of claim 1, wherein the insulation layer has a weight in  
2       the range of about 1.5 ounces per square yard to about 2.7 ounces per square yard.

1           10.      The thermal liner of claim 1, comprising multiple insulation layers, each  
2       insulation layer comprising a batt of entangled flame resistant fibers and having a three-  
3       dimensional pattern that defines a plurality of closed-cell air pockets that are configured  
4       to trap air to insulate the wearer of the thermal liner.

1           11.      The thermal liner of claim 1, further comprising a facecloth layer that is  
2       attached to the insulation layer, the facecloth layer comprising a plurality of flame  
3       resistant fibers.

1           12.     The thermal liner of claim 11, wherein the facecloth layer is attached to an  
2     inner side of the insulation layer such that the closed-cell air pockets of the insulation  
3     layer face the facecloth layer.

1           13.     The thermal liner of claim 11, wherein the facecloth layer comprises at  
2     least one of aramid, melamine, FR rayon, modacrylic, and carbon fibers.

1           14.     The thermal liner of claim 11, wherein the facecloth layer comprises a  
2     hydrophilic finish.

1           15.     A thermal liner for use in a protective garment, the liner comprising:  
2             an insulation layer comprising a batt of entangled flame resistant fibers, the  
3     insulation layer having a three-dimensional geometric pattern provided on an inner side of  
4     the insulation layer that forms a plurality of closed-cell air pockets that are defined by  
5     boundary walls and that are configured to trap air to insulate a wearer of the thermal liner;  
6     and  
7             a facecloth layer that is attached to the inner side of the insulation layer, the  
8     facecloth layer comprising a plurality of flame resistant fibers;  
9             wherein the thermal liner is shaped and configured for inclusion in the protective  
10    garment and for donning by the wearer.

1           16.     The thermal liner of claim 15, wherein the batt comprises at least one of  
2     aramid, melamine, FR rayon, modacrylic, and carbon fibers.

1           17.     The thermal liner of claim 15, wherein the closed-cell air pockets have  
2     geometric shapes that comprise at least one of honeycombs, circles, and triangles.

1           18.     The thermal liner of claim 15, wherein the closed-cell air pockets have  
2     transverse dimensions within the range of about 1/16 inches to about 1/2 inches and depth  
3     dimensions within the range of about 1/8 inches to about 5/16 inches.

1           19.     The thermal liner of claim 15, wherein the insulation layer has a weight in  
2     the range of about 0.75 ounces per square yard to about 8 ounces per square yard.

1           20.     The thermal liner of claim 15, wherein the insulation layer has a weight in  
2     the range of about 1.5 ounces per square yard to about 2.7 ounces per square yard.

1           21.     The thermal liner of claim 15, comprising multiple insulation layers, each  
2     insulation layer comprising a batt of entangled flame resistant fibers and a three-  
3     dimensional pattern that defines a plurality of closed-cell air pockets that are configured  
4     to trap air to insulate the wearer of the thermal liner.

1           22.     The thermal liner of claim 15, wherein the facecloth layer comprises at  
2     least one of aramid, melamine, FR rayon, modacrylic, and carbon fibers.

1           23.     The thermal liner of claim 15, wherein the facecloth layer comprises a  
2     hydrophilic finish.

1           24.     A protective garment, comprising:  
2             an outer shell formed of a flame and abrasion resistant material;  
3             a moisture barrier formed of a flame resistant material; and  
4             a thermal liner including an insulation layer comprising a batt of entangled flame  
5     resistant fibers, the insulation layer having a three-dimensional pattern provided on an  
6     inner side of the insulation layer that forms a plurality of closed-cell air pockets that are  
7     configured to trap air to insulate a wearer of the protective garment.

1           25.     The protective garment of claim 24, wherein the insulation layer batt  
2     comprises at least one of aramid, melamine, FR rayon, modacrylic, and carbon fibers.

1           26.     The protective garment of claim 24, wherein the closed-cell air pockets of  
2     the insulation layer comprise repeated geometric shapes.

1           27.     The protective garment of claim 26, wherein the repeated geometric  
2     shapes comprise at least one of honeycombs, circles, and triangles.

1           28.     The protective garment of claim 24, wherein the closed-cell air pockets of  
2     the insulation layer have transverse dimensions within the range of about 1/16 inches to  
3     about 1/2 inches and depth dimensions within the range of about 1/8 inches to about 5/16  
4     inches.

1           29.     The protective garment of claim 24, wherein the insulation layer has a  
2     weight in the range of about 0.75 ounces per square yard to about 8 ounces per square  
3     yard.

1           30.     The protective garment of claim 24, wherein the insulation layer has a  
2     weight in the range of about 1.5 ounces per square yard to about 2.7 ounces per square  
3     yard.

1           31.     The protective garment of claim 24, wherein the insulation layer comprises  
2     a facecloth layer that is attached to the inner side of the insulation layer, the facecloth  
3     layer comprising a plurality of flame resistant fibers.

1           32.     The protective garment of claim 31, wherein the facecloth layer comprises  
2     at least one of aramid, melamine, FR rayon, modacrylic, and carbon fibers.